

SAN FRANCISCO FORECAST DISTRICT.

Pleasant weather prevailed on the Pacific coast during the greater part of the month. From the 22d to 25th unusually warm weather prevailed in California. On the 24th the maximum temperature exceeded 115° at many points in the interior of the State. At Mount Tamalpais a temperature of 100° occurred, exceeding by 4° the highest on record at that station.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

A storm of marked severity crossed this district during the night of the 14th, for which warnings were issued six to twelve hours in advance. The wind was the heaviest on record for this season of the year. At the new North Head Weather Bureau station at the mouth of the Columbia River the maximum velocity of wind was 72 miles an hour from the southwest. No marine casualties were reported, but wheat and barley in the interior were damaged to the extent of over \$100,000.—*E. A. Beals, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocity.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
High areas.										
I.....	*30, p. m.	39	95	3, a. m.	32	65	1,875	2.5	750	31.2
II.....	8, a. m.	47	125	11, p. m.	39	75	2,500	3.5	714	29.8
III.....	14, a. m.	44	103	17, p. m.	27	80	2,650	3.5	757	31.5
IV.....	17, a. m.	54	121	23, a. m.	38	80	3,200	6.0	533	22.2
V.....	30, a. m.	50	107	31, p. m.	46	87	1,100	1.5	733	30.5
Sums.....							11,325	17.0	3,487	145.2
Mean of 5 paths.....							2,265		697	29.0
Mean of 17 days.....									666	27.8
Low areas.										
I.....	2, p. m.	43	91	4, a. m.	46	60	1,600	1.5	1,067	44.4
II.....	11, a. m.	53	122	14, a. m.	47	65	2,800	3.0	933	38.9
III.....	12, p. m.	51	114	17, a. m.	46	60	2,900	4.5	644	26.8
IV.....	14, p. m.	50	120	18, a. m.	45	64	2,875	3.5	821	34.2
V.....	15, p. m.	54	114	22, p. m.	41	70	2,550	2.5	1,020	42.5
VI.....	16, p. m.	38	105	23, p. m.	41	70	2,050	6.0	342	14.2
	26, p. m.	51	114	28, p. m.	45	100	800	2.0	400	16.7
Sums.....							15,570	23.0	5,227	217.7
Mean of 7 paths.....							2,224		747	31.1
Mean of 23 days.....									677	28.2

* June.

For graphic presentation of the movements of these highs and lows see Charts I and II.—*Geo. E. Hunt, Chief Clerk Forecast Division.*

RIVERS AND FLOODS.

The features of the month were the local floods in the Mississippi River and its tributaries in the States of Iowa and northwestern Missouri and the very destructive overflows of the rivers of eastern Texas. The Mississippi rise was almost entirely a Des Moines River flood, and extended only from Keokuk, Iowa, to the vicinity of Louisiana, Mo. It was due to heavy local rains in the Des Moines Valley on the 8th and 9th, supplemented by a downpour on the 13th in the lower Des Moines Valley and along the Skunk River, and again from the 17th to the 19th by general and heavy rains over Iowa. On the 10th the Des Moines River at Des Moines reached a stage of 21.0 feet, 2 feet above the danger line and within 1 foot of the traditional high stage of 1851. At Ottumwa, Iowa, the same river on the 14th reached a stage of 17.9 feet, 7.9 feet above the danger line. On the Mississippi River the

maximum stages were as follows: Keokuk, Iowa, 15.5 feet on the 21st, 0.5 foot above the danger line; Hannibal, Mo., 16.6 feet, 3.6 feet above the danger line. The warnings for this flood were timely and accurate and of great benefit to the persons affected. The following report thereon was made by Mr. F. Z. Gosewisch, official in charge of the United States Weather Bureau office at Keokuk, Iowa:

On July 9 the Des Moines office reported the river stage at that place to be 11 feet, a rise of 2 feet in twenty-four hours. This information was immediately bulletined and given to the railroads, and at the same time special reports were called for. The stage of the Mississippi at Keokuk was then 7 feet, sufficiently low to allow any rise from the Des Moines to run out rapidly. On the 9th Des Moines reported a further rise of 4.7 feet to 15.7 feet, and the stage at Ottumwa, Iowa, was 7.8 feet. Bulletins were issued as before, and special warnings were given to those interested in bottom lands that a further rise of 4 or 5 feet might be expected. The canning and pickle companies placed men at work to protect their lands, levees were inspected and strengthened where weak, and all preparations made to prevent any avoidable damage.

Further forecasts of continued rises were made on the 10th and 11th, but on the 12th notice was given that the crest had been reached and that from that time the waters would recede. At this time a personal inspection of the threatened district near Keokuk showed that, owing to the precautions taken as a result of the warnings, the overflow had been confined to a very small portion of the lowlands. All danger was then assumed to be past, but subsequent events proved that this was only for a day. The heavy local rains in the lower Des Moines and Skunk watersheds started another rise in the lower Des Moines, which by the morning of the 14th reached a stage of 17.9 feet, 7.9 feet above the danger line at Ottumwa and a rise of 6.3 feet in twenty-four hours. At the same time the upper Des Moines continued to fall. The following forecast was issued: "The Mississippi will rise slowly south of Keokuk. An unexpected rise developed in the Des Moines between Des Moines and Ottumwa during Saturday night and that river will rise at Keokuk for the next twenty-four hours." By the afternoon of the 14th thousands of acres of standing crops in the Des Moines bottoms below Keokuk had been overflowed, with the river still rising.

By the 17th both the Mississippi and the Des Moines rivers were falling rapidly, but, as before, heavy rains on the succeeding day checked the fall, and another sharp rise was speedily inaugurated. The following warning was at once distributed along the Mississippi as far south as Quincy, Ill.: "Heavy rains on the Des Moines, Skunk, and Iowa. The Mississippi will rise. Probably dangerous."

Supplementary forecasts were issued on the 18th, and by the afternoon of the 19th Fox Island, a large tract of unprotected corn land, lying between Alexandria, Mo., and the mouth of the Fox River, was overflowed to the depth of 1 foot, the water on the Keokuk gage then showing 14.5 feet, with the Des Moines water level higher than that of the Mississippi. The crest of 15.5 feet at Keokuk was reached on the 21st, and after that time the recession was steady.

An accurate estimate of the damage can not be given. Many thousands of acres of fine corn were overflowed, and the total losses will doubtless aggregate several hundred thousand dollars.

At Hannibal, Mo., the river was above the danger line from the 15th to the 26th, inclusive, with a maximum stage of 16.6 feet on the 23d, 3.6 feet above the danger line. The estimated loss to crops and farm implements from La Grange, Mo., southward to Louisiana, Mo., was \$125,000, or about 65 per cent of the value of a total crop on the inundated lands.

From below Louisiana to the mouth of the Illinois River the situation was not dangerous, although somewhat alarming between the 23d and 26th.

Nothing special occurred along the Missouri River as far as stages were concerned, although some high water was experienced between Kansas City and Boonville, Mo., due to the heavy rains of the first two weeks of the month over the lower Missouri Valley, the greater portion of the water coming from the Kansas River. At Kansas City on the 14th and 15th the stage of the river was 23.2 feet, 2.2 feet above the danger line. Warnings were first issued on the 8th, and daily thereafter until the waters began to subside. No damage of consequence was reported.

The Illinois River also contributed a generous share to the flood disturbance, causing great inconvenience and some considerable damage along its course, the upper portion especially. At Peoria, Ill., a stage of 21 feet was recorded on the 22d, 7 feet above the danger line.